

BEFORE THE STATE OF WASHINGTON
ENERGY FACILITY SITE EVALUATION COUNCIL

IN RE APPLICATION NO. 2002-01

EXHIBIT 26.0 (WPM-T)

BP WEST COAST PRODUCTS, LLC

BP CHERRY POINT COGENERATION
PROJECT

APPLICANT'S PREFILED DIRECT TESTIMONY

WILLIAM P. MARTIN

Q. Please introduce yourself to the Council

A. My name is William Martin and my business address is: Anvil Corporation,
1675 W. Bakerview Road, Bellingham, WA 98226.

Q. What is the subject of your testimony?

A. My testimony will address two topics. First is my background and experience related
to wastewater treatment. Second will be a discussion of the wastewater treatment

EXHIBIT 26.0 (WPM-T)
WILLIAM P. MARTIN
DIRECT TESTIMONY - 1
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1 system at the Cherry Point Refinery and the anticipated impact of discharge from the
2
3 proposed BP Cherry Point Cogeneration facility.
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7 **Q. What is your occupation and title?**

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9 A. I am an Environmental Engineer with Anvil Corporation providing consulting
10 services in wastewater treatment.
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15 **Q. Please describe your background/education and experience.**

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17 A. I have attached a current copy of my resume as Exhibit 26.1 (WPM-1). My
18 background is as follows. I have BS-Civil Engineering and MS-Civil Engineering
19 from the University of Wisconsin- Madison. I also have a PhD- Civil and Mineral
20 Engineering from the University of Minnesota- Minneapolis. In both the Masters and
21 PhD programs, my major field of study was Environmental Engineering.
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29 I became a Registered Professional Engineer in the State of Wisconsin in 1973 and
30 maintained the registration there. Most states, like Washington, recognize a P.E.
31 obtained in another State. During the 1970s while I was actively involved in
32 managing wastewater treatment systems, I became a certified wastewater treatment
33 plant operator in the State of Minnesota.
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40 I began my career in the 1970s as a project engineer and process control engineer in
41 the operation of industrial and municipal wastewater treatment systems. In the 1980s
42 and 1990s, I worked for ARCO. In 1983-84, I was a start-up engineer on a water
43 treatment plant at Prudhoe Bay, AK. In 1985 and through my retirement in 2000, I
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1 worked at the ARCO Products Tech Center in Anaheim, CA as the in-house
2 consultant for the ARCO West Coast refineries, specifically related to their
3 wastewater treatment systems.
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7 After retirement, I was employed by the Cherry Point Refinery for 2 years as project
8 engineer in their Environmental department. During this time period of 1986 through
9 2002, I assisted the Cherry Point Refinery with NPDES permit renewals, process
10 design engineering for the 1990s wastewater treatment plant (WWTP) expansions,
11 wastewater treatment process evaluations and control, and wastewater treatment
12 classes for the Refinery's operators.
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22 **Q. What is your role in connection with the BP Cherry Point Cogeneration**
23 **project?**
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25 A. I was retained to evaluate the process wastewater plan for the BP Cherry Point
26 Cogeneration project and the WDOE's Draft State Waste Discharge permit. In the
27 course of these analyses, I evaluated the impact of Cogeneration wastewater streams
28 on the Refinery's WWTP and on the ability to meet the Refinery's NPDES permit.
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36 **Q. What information about the BP Cogeneration project have you**
37 **reviewed?**
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39 A. I have reviewed portions of the BP Cherry Point Cogeneration Project Application
40 for Site Certification pertaining to wastewater, including section 3.3 and Appendix
41 F, and particularly the 'Wastewater Flows and Chemical Composition' table (Table
42 3.3-3 of the Application) for the process wastewater streams from the BP Cherry
43 Point Cogeneration project. I reviewed the Draft State Waste Discharge Permit. I
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1 have also participated in conference calls and meetings on these issues, including
2 meetings and calls with the Washington State Department of Ecology (WDOE), and
3 with other BP consultants and personnel addressing Cogen wastewater plans. In
4 reviewing this information, I have relied on over 25 years of experience in
5 wastewater treatment.
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13 **Q. What wastewater will be generated by the Cogen facility?**

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15 A. There are three primary wastewater streams from the BP Cogeneration facility. The
16 major process wastewater categories are (1) Demin Plant regeneration water, (2)
17 equipment drain and washdown oily wastewater and (3) Cooling Tower blowdown.
18 The expected flow rates and chemical composition of these streams are listed in
19 Table 3.3-3 of the project's Application for Site certification, a copy of which is
20 attached to my testimony as Exhibit 26.2 (WPM-2).
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29 **Q. How would you characterize this wastewater?**

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31 A. The wastewater from the Cogeneration project is comprised primarily of cooling
32 tower blowdown and Demin Plant Regeneration water. These are not typical
33 industrial wastewaters in that these streams have not been included in processes
34 exposing them to a multitude of chemicals. The cooling water, which makes up the
35 majority of the Cogen wastewater, does not contact any process in the Cogeneration
36 that could contaminate it, and the only chemicals added to the cooling water are a
37 relatively small amount of corrosion inhibitors. The only other substances in the
38 water are those that existed when the water was delivered to the Cogen project,
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1 primarily dissolved inorganic minerals. These minerals are concentrated when the
2 cooling water evaporates, but their mass is not increased.
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6 Table 3.3-3 of the Application lists the expected contaminant concentrations in the
7 Cogen wastewater streams. They are determined by analytical tests that classify and
8 measure contaminants into certain general categories. Examples of these tests are
9 BOD and COD tests that measure the oxygen demand of the water's contaminants, a
10 suspended solids test that measures the water's filterable solids greater than 0.45
11 micron in size, and the Oil & Grease test that measures the hexane extractable
12 contaminants in water. There are other analytical tests that measure specific
13 contaminant concentrations. These would include a wastewater's commonly present
14 cations and anions and the trace amounts of specific metals. The items listed under
15 'General Parameters' are often the major contaminants of concern. The levels of
16 BOD, COD, TSS and Oil & Grease expected for the Cogeneration project are much
17 lower than the current influent concentrations to the Refinery wastewater treatment
18 plant (as determined in the 2000-2001 Treatment Efficiency Study). The expected
19 concentrations in the Cogeneration wastewater streams for dissolved solids, major
20 cations, major anions and trace metals will be near or below current Refinery
21 wastewater influent concentrations (per the 2000-2001 Treatment Efficiency Study).
22 Table 3.3-4 of the Application, which is attached to my testimony as Exhibit 26.3
23 (WPM-3), reflects the Cogen Project's contribution to the Refinery wastewater
24 stream.
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3 **Q. How will the wastewater from the project be disposed of?**
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5 A. The process wastewater from the BP Cherry Point Cogen project will be disposed of
6 as a discharge to the Refinery's WWTP. The Cogen's process wastewaters, cooling
7 tower blowdown, Demin Plant regeneration water and equipment drain and
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9 washdown oily wastewater will be funneled to and commingled in an equalization
10 tank at the Cogeneration facility. The equalization tank wastewater will be pumped
11 to the Refinery's oil water sewer system where it will mix with the Refinery's
12 untreated process wastewater. The total estimated flow from the Cogen project is
13 190 gpm. It will combine with and be diluted by the approximately 2,000 gpm dry-
14 weather wastewater flow from the Refinery. The Cogen and Refinery effluent will
15 flow together under gravity influence to the Refinery's wastewater treatment plant.
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18 The Refinery's WWTP consists of three major areas: (1) primary treatment in
19 oil/water separators and equalization tanks, (2) secondary biological treatment in a
20 two step process of aerobic biological oxidation in an aeration tank and of biosolids
21 separation (and recycle) in a clarifier tank and (3) tertiary treatment in clarification
22 ponds. The effluent from the Refinery's WWTP is pumped to the Straits of Georgia
23 as discharge permitted under the Clean Water Act's NPDES program.
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27 **Q. Can you explain in more detail how the Refinery's wastewater treatment**
28 **system works?**
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30 A. Yes, as I said, the Refinery's WWTP consists of three major areas: (1) primary
31 treatment in oil/water separators and equalization tanks, (2) secondary biological
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1 treatment in a clarifier tank and (3) tertiary treatment in clarification ponds. For each
2 area, I will describe the concept of the wastewater treatment system and then provide
3 some specifics on Cherry Point's WWTP. Before doing so, a brief discussion of the
4 flow regime of the Refinery's wastewater through the WWTP is worthwhile. The
5 untreated Refinery wastewater and the Cogeneration project wastewater is collected
6 by the Oily Water Sewers and flows by gravity into the oil/water separators. After
7 floating oil and settleable solids separation in the Separators, the effluent water is
8 normally pumped to the Refinery's equalization tank. From this tank, flow rate is
9 regulated and flows by gravity through the secondary biological treatment system and
10 then on to the tertiary treatment in the clarification ponds. Finally, the final effluent
11 is pumped from the last pond to the outfall diffuser beneath the dock.
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25 **Primary Treatment:**

26 An oil/water separator is a liquid/liquid separation device for immiscible fluids that
27 have a specific gravity difference. The Refinery's WWTP has four oil/water
28 separators each with a liquid volume of ~0.26 MG and a surface area of 4600 sq. ft.
29 In a gravity-induced separation process, oil droplets of sufficient size that have a
30 rising velocity rate greater than the rise rate of the water will accumulate at the
31 surface and be skimmed. The skimmed oil is routed to wastewater tanks. Time and
32 heating are employed to provide an enriched oil phase that is recycled to the
33 Refinery. Excess water is returned to the separators. Sludge from the separators is
34 pumped to second stage separators. The sludge solids are allowed to resettle (and
35 accumulate over time) while the decant liquid is returned to initial oil-water
36 separators.
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3 The effluent from the separators flows into a sump. The effluent from the
4 sump is directed to an equalization tank. The equalization tank mixes the effluent,
5 and skims any remaining oil that accumulates on the underside of the internal
6 floating roof.
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10 11 12 **Biological Treatment:**

13 Aerobic biological wastewater treatment is the process by which microorganisms use
14 the wastewater's organic component as a food source, in the presence of oxygen, to
15 produce cell growth and the end products of carbon dioxide and water. The
16 Activated Sludge Process (ASP) is a continuous-flow, aerobic biological process for
17 the treatment of biodegradable wastewater. The ASP is characterized by the
18 suspension of microorganisms. These are maintained in a relatively homogenous
19 state with the wastewater by the mixing induced by the aeration system. The purpose
20 for this biological oxidation process is to reduce the wastewater oxygen demand
21 content. In doing so, the eventual release of wastewater into the Straits of Georgia
22 will not cause a dissolved oxygen depletion in the receiving water. The resulting
23 clarified effluent is usually high quality.
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39 **Tertiary Treatment**

40 The use of ponds after secondary biological treatment (hence the use of the word
41 'tertiary') is to further 'stabilize' the wastewater. These ponds are referred to as
42 "clarification ponds" or "stabilization ponds." The purpose for ponds at Cherry
43 Point has been as a system to improve the quality and to ensure that the biological
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1 system's effluent meets the NPDES limitations. In a general manner, the removal of
2 suspended solids is accomplished by slowing down the wastewater velocity. In this
3 way, suspended solids are given additional time to settle out from the water.
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8 Cherry Point's WWTP employs two clarification ponds arranged in series to allow
9 clarifier effluent to flow through both units. The effluent from the second pond
10 passes into a final holding pond (FHP) where it can be commingled with water
11 released periodically from the Storm Water Pond.
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15 **Discharge**

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17 The wastewater effluent is discharged to the Straits of Georgia through an effluent
18 diffuser pipe. The diffuser pipe is located beneath the southern section of the
19 Refinery's dock (> ¼ mile offshore) and discharges the wastewater effluent into
20 approximately 60 feet of water depth. The diffuser pipe is 52 feet long and has
21 thirteen 4-inch diameter holes that are spaced 4 feet apart. The design of the diffuser
22 helps to ensure a minimal impact of the effluent on the immediate receiving water
23 area. The discharge is subject to NPDES permit no. 002290-0, which requires daily
24 testing of the effluent and quarterly acute bioassay testing. During this permit
25 period, studies such as chronic toxicity testing of the final effluent and receiving
26 water sediment were also required.
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41 **Q. Will the addition of Cogen wastewater require any change in the Refinery's**
42 **wastewater discharge permit limits?**
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44 **A.** No. In the State of Washington, effluent limitations for an industrial facility are a
45 combination of technology-based considerations and receiving water criteria. The
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1 Cogen project will not alter the technology underlying the Refinery's NPDES permit
2 limits so there should be no change in the Refinery's NPDES permit based on
3 technology considerations. Water quality criteria consider the presence of toxics in a
4 permittee's discharge. The State of Washington has determined that, based on the
5 composition of the Refinery's discharge and applicable permitted dilution factors,
6 water quality effluent limits are not required for Cherry Point Refinery's wastewater
7 discharge. Analyses for the Cogeneration project indicate that the combined Refinery
8 and Cogen wastewater streams after treatment in the WWTP will yield an effluent
9 that should not have the potential to exceed State of WA receiving water criteria for
10 toxics. Therefore, no additions or changes to the Refinery's NPDES discharge permit
11 will be necessary due to considerations of the State's receiving water criteria. In
12 sum, there are no factors mandating change in the Refinery's NPDES permit limits
13 to accommodate the Cogen's wastewater discharge as well.
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29 **Q. Will the Cogen's wastewater significantly impact the quality of the wastewater**
30 **outfall from the Refinery treatment system in any way?**
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32 A. No. As demonstrated in Table 3.3-3, the chemical composition of the Cogen
33 wastewater will not be high. Once this wastewater has been mixed with the Refinery
34 influent and processed through the Refinery's wastewater treatment system, it will
35 lead to only very slight estimated increases in certain pollutants discharged to the
36 receiving water. Further, when the pollutants reach the edge of the Refinery's
37 permitted mixing zone, the added amounts of pollutants due to the Cogeneration
38 process will be inconsequential. In no instance it is believed that this minor increase
39 in pollutants will impact the Refinery's capability to meet its current NPDES permit
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1 limitations or have an impact of any significance on the quality of the final effluent.
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3 There should be no adverse impact on the receiving water due to addition of Cogen's
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5 wastewater to the Refinery's WWTP. The direct testimony of Michael Kyte
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7 addresses impacts of the Cogen's wastewater on the marine environment.
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11 **Q. Will Cogen's wastewater increase the temperature of the outfall from the**
12 **Refinery's treatment system?**
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14 A. No, it will not. The commingled Cogen process wastewater streams are expected to
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16 have a temperature under 100°F. The Refinery's influent process wastewater
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18 temperature is above 100°F. Therefore, Cogen process wastewater will not increase
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20 the overall temperature of the influent stream to the Refinery's WWTP and in fact
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22 may decrease slightly the combined influent wastewater. It should also be noted that
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24 the combined wastewater streams will remain and cool in the Refinery's WWTP for
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26 approximately six days. Depending on the season of the year, the temperature of the
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28 Refinery's wastewater discharged to the outfall will be between 60°F and 85°F.
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30 **END OF TESTIMONY**
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